Atomic Structure Worksheet

Name: _____

Period: _____

1. Name the three particles of the atom and their respective charges are:
   a. _____ _____
   b. _____ _____
   c. _____ _____

2. The number of protons in one atom of an element determines the atom's _____, and the number of electrons determines _____ of an element.

3. The atomic number tells you the number of _____ in one atom of an element. It also tells you the number of _____ in a neutral atom of that element. The atomic number gives the "identity "of an element as well as its location on the Periodic Table. No two different elements will have the _____ atomic number.

4. The _____ of an element is the average mass of an element's naturally occurring atoms, or isotopes, taking into account the _____ of each isotope.

5. The _____ of an element is the total number of protons and neutrons in the _____ of the atom.

6. The mass number is used to calculate the number of _____ in one atom of an element. In order to calculate the number of neutrons you must subtract the _____ from the _____.

7. Give the symbol and number of protons in one atom of:

Lithium _____	Bromine _____
Iron _____	Copper _____
Oxygen _____	Mercury _____
Arsenic _____	Helium _____

8. Give the symbol and number of electrons in a neutral atom of:

Uranium _____ Chlorine _____

Boron _____ Iodine _____

Antimony _____ Argon _____

9. Give the isotope symbol and number of neutrons in one atom of the following elements. Show your calculations.

Barium – 138 _____ Sulfur – 32 _____

_____

Carbon – 12 _____ Hydrogen – 1 _____

_____

Fluorine – 19 _____ Magnesium – 24 _____

_____

Silicon - 28 _____ Mercury – 202 _____

_____

10. Name the element which has the following numbers of particles. Be specific. (Include charges and mass numbers where possible.)

26 electrons, 29 neutrons, 26 protons _____

_____

53 protons, 74 neutrons _____

_____

2 electrons (neutral atom) _____

_____

20 protons _____

_____

86 electrons, 125 neutrons, 82 protons (charged atom) _____

_____

0 neutrons _____

_____

11. If you know **ONLY** the following information can you always determine what the element is? (Yes/No).

number of protons _____

number of neutrons_____

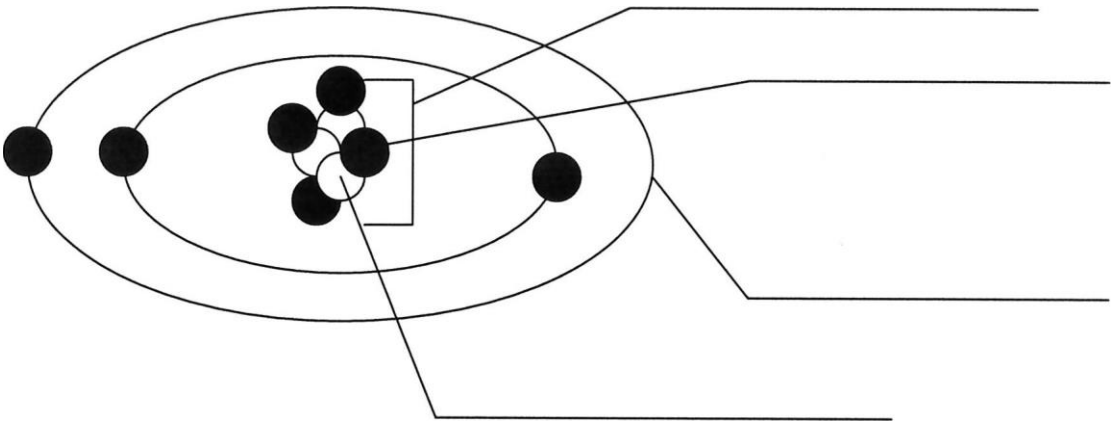
number of electrons in a neutral atom _____

number of electrons_____

Name: _____

On the Inside

Part l: Label the parts of this atom (nucleus, protons, electrons, neutrons)



Part 2: Answer these:

1. The subatomic particle with no electrical charge is the 2. The subatomic particle with a positive charge is the 3. The subatomic particle with a negative charge is the 4. There are the same number of these two particles in an atom _____&_____5. The atomic number is the same as the number of

_____

_____

_____

_____

6. Where is most of the mass of an atom located?

_____

7. Which particles account for the mass of the atom? (Atomic mass or mass number) and

_____ _____

8.Com lete the followin table

Symbol	Atomic Number	Number of Protons	Number of Neutrons	Number of Electrons	Mass
	9				

9. The atomic number is the number of_____ in one atom of an element. It is also the number of _____ in a neutral atom of that element. The atomic number gives the "identity "of an element.

No two different elements will have theatomic number.

_____

10. The _____ of an element is the average mass of an element 's naturally occurring atoms, or isotopes, taking into account theof each isotope.

11. In order to calculate the number of neutrons you must _____ _____ subtract the from the

_____ _____

12. Give the symbol and number of protons in one atom of:

Lithium _____ Mercury _____ Iron _____

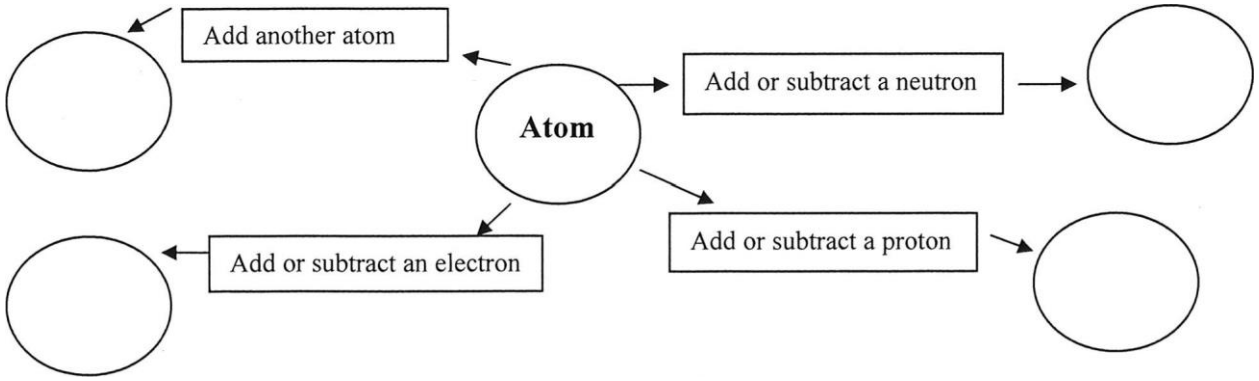
13. Com lete the table below.

Symbol	Atomic Number	Mass Number	Number of Protons	Number of Electrons	Number of Neutrons
23					
		39		19	
			38	38	50
	20	40			
Ions					
+2					
-1					
Isoto es					
		110	47		
36S					
26M					

14. Draw a Bohr model for the following:

Argon (18) Magnesium (12)

15. Complete the following with the terms "new element", ion, isotope, or molecule.



Name: Period: Date:

Atomic Structure

You can become mote fafY1iliar with the atomic stfucture of some elements by completing the chart. You have been given enough inf0Émation to fill in all the blahks. (There is no need to use a periodic table.)

Sub stance	S ymbol	Atomic Number	Mass Number	Number of Protons	Number of N eutrons	Number of electrons
H e Iium		2				
M a gne sium		12			12	
Zinc		30	65			
Bromine			80			35
A luminum				13	14	
U ranium						92
S o d ium		11			12	

Hydrogen		1	1			
C a lc ium			40	20		
S ilver				47	61	
M ercury		80	201			
Iodine			127	53		
P o tassium					20	19

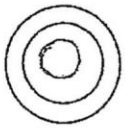
N

P = ___

N = ___

E = ___

Bohr Diagram



N

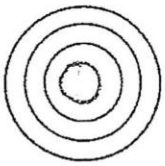
Al

P = ___

N = ___

E = ___

Bohr Diagram



Al

F

P = ___

N = ___

E = ___

Bohr Diagram

F

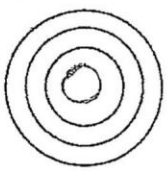
Ar

P = ___

N = ___

E = ___

Bohr Diagram



Ar

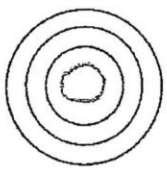
Si

P = ___

N = ___

E = ___

Bohr Diagram



Si

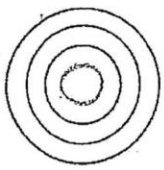
Na

P = ___

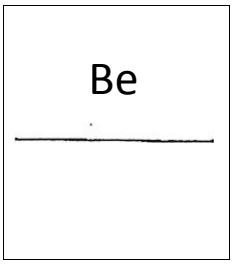
N = ___

E = ___

Bohr Diagram

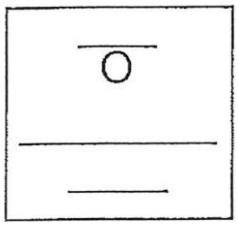


Na



Bohr Diagram

Be

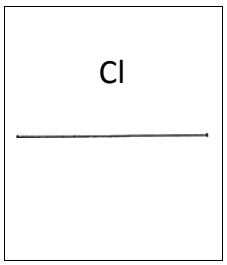


P = ___

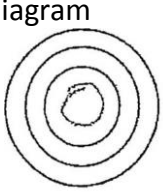
N = ___

E = ___

Bohr Diagram



Bohr Diagram



Cl

Physical Science Name/Per/Due date_____
Valence Electron Practice

Directions: Give the total number of electrons and the number of valence electrons for each element listed below.

1. Hydrogen
2. Lithium
3. Beryllium
4. Carbon
5. Fluorine
6. Neon
7. Magnesium
8. Chlorine
9. Arsenic
10. Krypton
11. Barium
12. Tin
13. Iodine
14. Aluminum

Directions: Give the element names for the element in the given period with the given number of valence electrons.

15. 2^{nd} period, 5 valence electrons
16. 5^{th} period, 1 valence electron
17. 3^{rd} period, 7 valence electrons
18. 6^{th} period, 8 valence electrons
19. 4^{th} period, 3 valence electrons
20. 3^{rd} period, 6 valence electrons

Isotopes

The number of protons in a nucleus determines the identity of the element. For example, any atom having 6 protons will be a "carbon" atom. If we were to add an extra proton to the nucleus, we would have an entirely different element. For example,

C (6 protons) + 1 proton ⟶ N (7 protons)

On the other; hand, if we add an extra NEUTRON to a nucleus we simply end up with the same element, just a little heavier, since the charge on the nucleus would be unchanged.

> ISOTOPES of a given element have the same ATOMIC NUMBER but a *different* ATOMIC MASS.

In other words, isotopes have the same number of protons but a different number of neutrons. An isotope is identified by its mass number, the sum of the protons and neutrons. The most common isotope of Carbon has a mass number of 12 and can be written as Carbon-12, two other isotopes are Carbon-13 and Carbon-14. Despite their different mass numbers, all three carbon isotopes react the same way chemically.

PART I. Answer the questions based on the above reading.

1. What is an isotope?

_____

_____
_____

2. What does the number next to isotopes signify?

_____

_____
_____

3. How can you tell isotopes of the same element apart?

_____

_____
_____

PART II. For each of the following isotopes, write the number of protons, neutrons, and electrons. Assume all atoms are neutral.

	Carbon-12	Carbon-13	Carbon-14
# of protons			
# of neutrons			
# of electrons			

	Chromium-58	Chromium-63
# of protons		
# of neutrons		
# of electrons		

	Sulfur-23	Sulfur-25
# of protons		
# of neutrons		
# of electrons		

	Nitrogen-15	Nitrogen-20
# of protons		
# of neutrons		
# of electrons		

	Selenium-50	Selenium-55
# of protons		
# of neutrons		
# of electrons		

	Sodium-12	Sodium-20
# of protons		
# of neutrons		
# of electrons		

PART III. Fill in the isotope names and any missing information on the chart. Use your periodic table and the information provided. Assume all atoms are neutral.

# of protons	32	
# of neutrons	30	32
# of electrons		

# of protons	25	
# of neutrons	17	15
# of electrons		

# of protons			# of protons			
# of neutrons	48	51	# of neutrons		113	111
# of electrons		46	# of electrons		55	

	Iron-	Iron-
# of protons		
# of neutrons	27	30
# of electrons		

	Iodine-	Iodine-
# of protons		
# of neutrons	32	35
# of electrons		

	Germanium-	Germanium-
# of protons		
# of neutrons	33	36
# of electrons		

	-10	-12
# of protons		6
# of neutrons		
# of electrons	6	

	-22	-25
# of protons		
# of neutrons		
# of electrons	11	

	-54	-56
# of protons	24	
# of neutrons		
# of electrons		